



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
 1200 Sixth Avenue
 Seattle, WA 98101

June 2, 2005

Reply To
 Attn Of: OCE-164

Roy J. Schepens, Manager
 United States Department of Energy, Office of River Protection
 P.O. Box 450, MSIN H6-60
 Richland, WA 99352

Re: Approval of the Toxic Substance Control Act (TSCA) Risk-based Disposal Approval (RBDA)
 Application for the Mobilization of Single-Shell Tank Solid Waste Using Double-Shell Tank
 Supernate

Dear Mr. Schepens:

This letter constitutes approval under the authority of 40 Code of Federal Regulations (CFR) 761.61(c) to manage certain polychlorinated biphenyl (PCB) remediation wastes in conjunction with single-shell tank (SST) retrieval, subject to conditions established below. The rationale of the United States Environmental Protection Agency (EPA) for establishing each of these conditions is contained in the Statement of Basis appearing as Enclosure 2 to this letter. This written decision for a risk-based method for disposal of PCB remediation waste is based on the United States Department of Energy Office of River Protection (Energy) application for a risk-based disposal approval dated November 19, 2004, as well as additional information provided to the EPA in support of this application as documented in the Statement of Basis. This approval constitutes Phase I approval (as described in EPA's letter of December 9, 2004, from Michael A. Bussell to you and in the Statement of Basis for this approval) of the November 19, 2004, application, and Phase II approval for retrieval of tank 241-S-102. Energy is authorized to conduct only those retrieval activities related to tank 241-S-102, and is precluded from conducting the remainder of the proposed retrieval activities pending associated Phase II determinations by EPA. Enclosure 1 to this approval documents the administrative record that supports this determination. In granting this approval, EPA finds that the proposed management of PCB remediation wastes for retrieval of wastes from specified single-shell tanks, subject to the conditions below, will not pose an unreasonable risk of injury to health or the environment. Energy shall ensure that activities conducted pursuant to this authorization are in full compliance with conditions of this authorization. The conditions of this approval are enforceable under TSCA and the implementing regulation at 40 CFR Part 761.61(c). Any actions by Energy which violate the terms and conditions of this letter may result in administrative, civil, or criminal enforcement by EPA in accordance with Section 16 of TSCA, 15 USC § 2615.

Phase I (General) Conditions

- 1) Energy shall conduct all retrieval activities in accordance with tank waste retrieval work plans (TWRWPs), (or a functions and requirements [F&R] document in the case of tank 241-S-102), as approved by the Washington State Department of Ecology as Tri-Party Agreement (TPA) primary documents.
- 2) Energy shall maintain air emissions control on single-shell tank ventilation systems during retrieval activities subject to this approval according to the requirements of the Washington State Department

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of Health Radioactive Air Emissions Notice of Construction Approval AIR-04-503 (for tank 241-S-102) and AIR-04-1102 (for C-farm tanks).

- 3) Nothing in this approval relieves ORP of any obligation to comply with all other rules and regulations applicable to the retrieval activities documented in the TWRWP (or F&R in the case of tank 241-S-102) approved as a TPA primary document.
- 4) If anytime before during or after management of PCB remediation waste for SST retrieval, Energy possesses or is otherwise made aware of any data or information (including but not limited to site conditions that differ from those presented in the November 19, 2004 RBDA application or cited as the basis for this approval) indicating that retrieval activities approved herein may pose an unreasonable risk of injury to health or the environment, Energy must report such data, via facsimile or e-mail to EPA according to Phase 1 Condition 6 within five working days, and in writing to the Regional Administrator within 30 calendar days, of first possessing or being made aware of that data. Energy shall also report new or different information related to a condition at any element of the SST systems associated with the approved retrieval activities if the information is relevant to this approval. Energy shall immediately cease all retrieval activities approved herein that may pose an unreasonable risk of injury to health or the environment. Such activities shall not resume until written approval is obtained from EPA that finds the activities in question no longer pose an unreasonable risk of injury to health or the environment.
- 5) EPA reserves the right to modify or revoke this approval based on information provided pursuant to Phase 1 Condition 4, or any other information available to EPA that provides a basis to conclude that the retrieval activities covered by this approval pose an unreasonable risk of injury to health or the environment.
- 6) Submissions required by this approval shall be provided to EPA and Ecology as follows:

EPA: Michael A. Bussell
Office of Compliance and Enforcement
EPA Region 10, 1200 6th Ave., MS OCE-164
Seattle, WA 98101
E-mail: Bussell.michael@epa.gov
Facsimile: (206) 553-7176

w/copies to Dave Bartus
c/o Washington State Department of Ecology
Facsimile: (509) 372-7971
3100 Port of Benton Blvd.
Richland, WA 99354
E-mail: Bartus.dave@epa.gov
Facsimile: (509) 372-7971
Hanford campus mail stop: HO-57

Ecology: Mike Wilson, Nuclear Waste Program Manager
Washington State Department of Ecology
3100 Port of Benton Blvd.
Richland, WA 99352
E-mail: miwi461@ecy.wa.gov
Hanford campus mail stop: HO-57

Phase II (Tank-Specific) Conditions – Tank 241-S-102

- 1) For retrieval of tank 241-S-102, the spatial boundaries of this approval shall be the tank 241-SY-102 SY-02A pit for supernate retrieved from tank 241-SY-102, extending to (following the direction of supernate flow/retrieved slurry) the connection to tank 241-SY-102 return riser for slurry returned from tank 241-S-102 to tank 241-SY-102. Tank 241-S-102 is explicitly included within the boundaries of this approval.
- 2) All equipment used for carrying out retrieval activities external to tank 241-S-102 shall comply with the requirements of 40 CFR 265.191 through 196. Tank 241-S-102 proper and any equipment used for retrieval activities internal to this tank are excluded from this requirement. With respect to compliance with the requirements of 40 CFR 265.196 (response to leaks or spills, and disposition of leaking or unfit-for-use tank systems), Energy shall maintain and conduct retrieval operations according to procedures no less stringent than Sections 4.2.2, 5.3 and 6.7.2 of the draft document RPP-17043, Rev. 1d, entitled "Process Control Plan for Saltcake Dissolution in Tank 241-S-102."
- 3) Retrieval activities conducted pursuant to this approval shall be subject to Conditions 2, 3 and 5 of Ecology's tank 241-S-102 Functions and Requirements primary document approval, dated May 2, 2005. Notification required by Condition 5 of the Ecology approval letter shall be made to EPA contact in Phase 1 Condition 6 of this approval as well as to Ecology.
- 4) Within 45 days following the effective date of this approval, Energy shall submit to EPA a post-retrieval Data Quality Objective (DQO) report and a sampling and analysis plan (SAP) for post-retrieval characterization and residual PCB remediation waste sampling for tank 241-S-102. These plans may be based in whole or part on closure requirements pursuant to Washington Administrative Code 173-303-610). Energy shall ensure that the DQO report and the sampling and analysis plan provide for generation of data characterizing residual PCB remediation waste adequate for purposes of evaluating the risk of injury to human health and the environment from residual PCB remediation waste, and for evaluation of appropriate removal, decontamination or disposal actions for such residual PCB remediation waste. This plan shall be based on and consistent with the requirements of TPA Appendix I Section 2.1 requirements.
- 5) Within 120 days following completion of retrieval activities covered by this approval, or other such time corresponding to a submission date approved by Ecology through applicable TPA administrative processes with respect to requirements of TPA Appendix I Section 2.1.7, Energy shall submit to EPA either a retrieval data report pursuant to the approved DQO/sampling and analysis plan required by Phase II Condition 4 above, or a TPA Appendix H request for exception. This report shall include the information required by TPA Appendix I Section 2.1.7. This report shall specifically include results reasonably available at the time of submission from the High-Resolution Resistivity (HRR) pilot test described in Section 5.4.5 of the tank 241-S-102 Functions and Requirements TPA primary document as approved by Ecology.
- 6) Within 120 days following completion of retrieval activities covered by this approval, or other such time corresponding to a submission date approved by Ecology through applicable TPA administrative processes with respect to requirements of TPA Appendix I Section 2.2.1, Energy shall submit plans and schedules for removal, decontamination or disposal of post-retrieval residual PCB remediation waste. These plans and schedules may be based upon and consistent with component closure activity

plans for tank 241-S-102 required by WAC 173-303-610, and TPA Appendix I Section 2.2.1. If component closure activity plans are used in whole or part as the basis for post-retrieval management of residual PCB remediation waste, Energy shall ensure that total PCBs, measured as the sum of Aroclors, are identified as constituents of concern in the component closure activity plans. For retrieval equipment within the scope of Condition 1 that may be used for subsequent SST retrievals requiring approval under 40 CFR 761.61(c), Energy may submit documentation of the proposed reuse in lieu of the otherwise-required plans and schedules. These plans and schedules shall comprehensively address all aspects of residual PCB remediation waste management related to activities covered by this authorization, specifically including but not limited to in-tank residuals in tank 241-S-102, any spills, releases or leaks from tank 241-S-102 during retrieval, residuals in equipment within the scope of Phase II Condition 1 and any related spills or releases. Energy may also request from EPA written approval of alternate submission schedules as necessary to ensure integration of these submissions with permit modification requests and component closure activity plans required by the Washington State Department of Ecology pursuant to TPA milestone M-45-15.

- 7) Energy shall maintain and operate a baseline (drywell monitoring) and supplemental (modified static liquid level monitoring/waste material balance) leak detection, monitoring and mitigation (LDMM) system. With respect to this system, Energy shall maintain and conduct retrieval operations pursuant to procedures consistent with Sections 5.1, 5.2, and 6.7.1 of RPP-17043, Rev. 1e, entitled "Process Control Plan for Saltcake Dissolution in Tank 241-S-102".
- 8) Energy may request changes to schedules specified in these tank 241-S-102 Phase II conditions. Such requests shall be in writing, including justification for the requested modifications, and submitted to the EPA contacts listed in Phase I Condition 6. Prior to written approval of the requested change, Energy shall comply with the existing conditions of this approval.
- 9) Energy shall submit to EPA the final report of high-resolution resistivity (HRR) leak detection test conducted pursuant to the Ecology-approved test plan RPP-17191, Rev. 1, concurrent with submission of this report to Ecology.

Should you have any questions or comments, please contact Dave Bartus at (509) 372-7938, or Bartus.dave@epa.gov.

Sincerely,


Michael A. Bussell, Director
Office of Compliance and Enforcement

Enclosures (2)

cc: Mike Wilson, Washington State Department of Ecology
Moses Jarayssi, CH2M Hill Government Services, Inc.
Phil Miller, CH2M Hill Government Services, Inc.

Enclosure 1

Supporting Documentation

Approval of the TSCA RBDA Application for Retrieval of Wastes from Single-Shell Tanks

- 1) *"Hanford Federal Facility Agreement and Consent Order,"* Washington State Department of Ecology, United States Environmental Protection Agency, and United States Department of Energy, 89-10-Rev. 6, April 18, 2003. Available at <http://www.hanford.gov/tpa/tpahome.htm>
- 2) *"SST Interim Stabilization Consent Decree,"* No. CT-99-0576-EFS, dated September 30, 1999, filed with the US District Court for the state of Washington, Eastern District.
- 3) *"S-102 Initial Waste Retrieval Functiona and Requirements,"* RPP-10901, Rev. 1C, N.S. Cannon, dated June 30, 2004, Cogema Inc., Richland, Wqashington.
- 4) *"C-Farm 100 Series tanks, Retrieval Process Flowsheet Description",* RPP-21753, Rev. 0, P. G. Haigh, et al., August 12, 2004, CH2M HILL Hanford Group, Inc., Richland, Washington.
- 5) *"241-C-103 and 241-C-109 Tanks Waste Retrieval Work Plan",* RPP-21895, Rev. 0A, R. S. Robinson, dated July 27, 2004, CH2M HILL Hanford Group, Inc., Richland, Washington.
- 6) *"241-C-102, 241-C-103, 241-C-107, 241-C-108, and 241-C-112 Tanks Waste Retrieval Work Plan,"* RPP-22393, Rev. 0, September 15, 2004, CH2M Hill Hanford Group, Inc., Richland, Washington.
- 7) *"241-C-105, 241-C-110, and 241-C-111 Tanks Waste Retrieval Work Plan,"* RPP-22520, Rev. 0, September 30, 2004, CH2M Hill Hanford Group, Inc., Richland, Washington.
- 8) *"Framework Agreement for Management of Polychlorinated Biphenyls (PCBs) in Hanford Tank Waste,"* August 31, 2000, Washington State Department of Ecology, U.S. Environmental Protection Agency, and U.S. Department of Energy.
- 9) *"Double Shell Tank System PCB Risk Assessment",* RPP-8393, Rev. 0, J.W. Pratt, et al, dated August 29, 2001, CH2M HILL Hanford Group, Inc., Richland, Washington.
- 10) *"Application for Risk-Based Disposal Approvals for Polychlorinated Biphenyls, Hanford 200 Area Liquid Waste Processing Facilities,"* DOE/RL-2002-02, February, 2002 U.S. Department of Energy.

- 11) *"Hanford Facility Resource Conservation and Recovery Act Permit,"* WA7 89000 8967 Rev. 8, Washington State Department of Ecology, U.S. Environmental Protection Agency, and U.S. Department of Energy, Olympia, Washington. Available at <http://www.ecy.wa.gov/programs/nwp/piarchive.htm>
- 12) Memorandum, Dave Bartus, EPA to file, "Analysis of Co-Planar PCBs in Hanford Tank Wastes," April 8, 2004.
- 13) Letter, Jeffery J. Lyon, Washington State Department of Ecology to Roy J. Schepens, United States Department of Energy, Office of River Protection, July 22, 2004.
- 14) File memorandum from D. Bartus, "Simplified Equilibrium PCB Calculations for SST Retrieval." December 28, 2004.
- 15) "Comparison of Sluicing C-Farm with Raw Water versus Recycled Supernate," Attachment 2, 04-TPD-102, undated.
- 16) E-mail, "FW: Information need for SST RBDA," Toni Faust, CH2M Hill to Dave Bartus, EPA, dated December 15, 2004.
- 17) "Additional Information for the State of Washington, Department of Ecology Supporting the Use of Recycle Supernate in Retrieving Tank 241-S-102," CH2M-0403601, undated.
- 18) Letter, Michael A. Bussell, EPA, to Roy J. Shepens, Energy-ORP, dated December 9, 2004.
- 19) "Tank 241-S-102 Retrieval Process Flowsheet," RPP-18835, Revision 0, March, 2004.
- 20) "Use of Supernate in Tank S-102," Jeffery J. Lyon, Ecology to Roy J. Schepens, ORP, dated December 13, 2004.
- 21) "Waste Compatibility Assessment of Tank 241-S-102 Retrieval Waste (SST-R-04-01) with Tank 241-SY-102 Waste," RPP-20229, dated April 27, 2004.
- 22) Radioactive Air Emissions Notice of Construction Approval AIR-04-503, Washington State Department of Health, May 17, 2004.
- 23) Radioactive Air Emissions Notice of Construction Approval AIR-04-1102, Washington State Department of Health, November 22, 2004.
- 24) Letter, Jeffery J. Lyon, Washington State Department of Ecology, to Roy J. Schepens, United States Department of Energy – Office of River Protection, dated July 19, 2004.

- 25) Letter, Jeffery J. Lyon, Washington State Department of Ecology, to Roy J. Schepens, United States Department of Energy – Office of River Protection, dated July 27, 2004.
- 26) “Clarification on Approval Letter for the Use of Supernatant from the Double Shell Receiving Tank in Tank S-102,” Jeffery J. Lyon, Ecology to Roy J. Schepens, ORP, dated May 2, 2005.

Enclosure 2

Statement of Basis

Approval of the Toxic Substances Control Act (TSCA) Risk-Based Disposal Approval (RBDA) Application for Retrieval of Wastes from Hanford's Single-Shell Tanks (SSTs) Using Double-Shell Tank (DST) Supernate.

Background

Retrieval of wastes from Hanford's 149 aging single-shell tanks and subsequent closure of the tank systems is one of the most complex, technically-challenging, and environmentally-significant challenges remaining as part of cleanup and closure of the Hanford Federal Facility. The general approach to addressing the environmental and regulatory compliance issues associated with the SST tank systems consists of three principle phases: interim stabilization, or retrieval of pumpable liquids; retrieval of remaining wastes; and completion of activities necessary to satisfy applicable closure standard, including but not limited to, the dangerous waste closure requirements of Washington Administrative Code (WAC) 173-303. Technical requirements and schedules of compliance for these various activities are documented in the Hanford Federal Facility Agreement and Consent Order, or Tri-Party Agreement (TPA), and the SST Interim Stabilization Consent Decree (References 1 and 2, respectively). Specific TPA sections relevant to SST retrieval and closure include Milestone series M-45, and Action Plan Appendices H and I. Certain elements of SST waste management are also subject to requirements of M-23, relating to integrity assessment of SSTs and ancillary equipment. To date, interim stabilization activities under the consent decree have essentially been completed. The United States Department of Energy (Energy) has submitted documentation supporting completion of retrieval from tank C-106¹, and has

¹ Documents submitted by Energy regarding completion of retrieval from tank 241-C-106 include the following:

- 1) "Basis for Exception to the Hanford Federal Facility Agreement and Consent Order Waste Retrieval Criteria for Single-Shell Tank 241-C-106," RPP-20668, Revision 1, June, 2004
- 2) "Stage I Retrieval Data Report for Single-Shell Tanks 241-C-106," RPP-20110, Revision 2, June, 2004.
- 3) "Stage II Retrieval Data Report for Single-Shell Tank 241-C-106," RPP-20577, Revision 0, May, 2004.

These documents are not included in the References section as a basis for this RBDA approval, but they may be examples of the sort of data that Energy may submit in fulfillment of Phase II RBDA approval Condition 4 and/or 5.

initiated retrieval of tanks 241-S-112, 241-C-203, and saltcake dissolution from tank 241-S-102.

Initial M-45 milestone requirements for SST retrieval activities were based on the concept of retrieval technology demonstrations, consistent with the recognition that many aspects of retrieval activities were expected to pose significant challenges, with little precedent to guide retrieval planning or decision-making. TPA milestone M-45-05-T17 required that certain SST retrievals serve as technology demonstrations, based on information provided in a Functions and Requirements (F&R) document, to be submitted as a TPA primary document, as defined in TPA Action Plan Section 9.1. TPA milestone M-45-05-T17 required F&R documents to:

“...establish demonstration system specifications (including leak detection, monitoring, and mitigation [LDMM] system specifications) and will also include a scoping level retrieval performance evaluation (RPE) for each tank. The F&R document and its associated RPE shall also provide, as a separate evaluation for each [tank], environmental and human health risk evaluation data, information associated with estimated waste volumes to be retrieved, the maximum volume which could leak during retrieval, and risk from residual waste. This document will detail known and estimated radionuclide contamination and contaminant migration within the vadose zone as based of calculation. LDMM and RPE documentation provided will be adequate to allow Ecology to assess the adequacy of the demonstration systems. [...] The retrieval F&R document will document all pertinent retrieval and closure requirements, e.g., those specific to the extent of retrieval necessary to allow closure. DOE will submit its LDMM strategy as part of the F&R document, prior to initiation of design. [...]”

Subsequent revisions to TPA milestone M-45, in response to Energy efforts to significantly accelerate SST retrieval and closure activities, replaced F&R documents governing retrieval activities with Tank Waste Retrieval Work Plans, or TWRWPs. In essence, TWRWPs are similar to F&R documents, but expanded in scope and expected level of detail and specificity. In part, the expanded scope of a TWRPW compared to an F&R document also reflects lessons learned in the development of initial F&R documents. See Section 2.1.3 of TPA Action Plan Appendix I. To date, Energy has submitted F&R documents to Ecology for tanks 241-S-102 (Reference 3), 241-S-109, 241-S-112, and 241-C-241-200 through 203. TWRWPs have been submitted for remaining C-farm tanks (References 5 through 7).

The selection of SSTs for retrieval is a complex task involving balancing of a number of criteria, including available DST space to receive retrieved wastes, and sequencing of specific SSTs. Relevant requirements include TPA milestone M-46 relating to DST space evaluation, milestone M-45-02 relating to an annual update to the SST retrieval sequencing document, and TPA Appendix I, specifically sections 2.1 and 2.1.2. Through this process, Energy has identified twelve tanks for the first phase (as defined in section 2.1.2 of TPA Appendix I) of SST retrieval. These tanks include 241-S-102, 241-C-101

through 105, and 242-C-107 through 112. As noted above, Energy has submitted documentation to Ecology and EPA demonstrating completion of retrieval for tank 241-C-106.

Waste remaining in SSTs is generally in one of three physical forms: supernate, or free liquids; saltcake; and sludge, or insoluble solids. As noted above, essentially all supernate has been retrieved from SSTs according to the requirements of the SST interim stabilization consent decree (Reference 2). Specific technical performance requirements for SST interim stabilization are detailed in the consent decree. Therefore, subsequent retrieval activities will focus on saltcake and/or sludge retrieval, according to the nature of wastes remaining in any particular SST. Pre-solid waste retrieval inventories for the twelve SSTs considered in the RBDA application are reported in the "241-C Farm 100 series Tank Retrieval Process Flowsheet Description," RPP-21753 (Reference 4) and "Tank 241-S-102 Retrieval Process Flowsheet," RPP-18835 (Reference 19). The choice of technology for retrieval and retrieval implementation requirements depend principally on the nature of wastes to be retrieved, and whether or not the SST is considered a sound tank, or a known/suspected leaker. In general, however, saltcake retrieval is typically accomplished through dissolution in water. Sludge retrieval may be accomplished through a variety of sluicing or vacuuming techniques, all of which use varying amounts of water to mobilize the relatively insoluble sludge so that it can be pumped to the receiving DST during retrieval. As a means of minimizing the volume of additional liquids that must be managed in DSTs as part of SST retrieval, Energy has proposed use of DST supernate in lieu of clean (more precisely, raw) water for sludge retrieval and/or mobilization².

On August 31, 2000, the United States Environmental Protection Agency (EPA), Energy, and the Washington State Department of Ecology (Ecology) entered into a Framework Agreement concerning management of polychlorinated biphenyl (PCB) remediation wastes regulated under the Toxic Substance Control Act (TSCA) in Hanford tanks (Reference 8). As noted in the Framework Agreement, the signatories sought agreement on an integrated regulatory pathway for management of TSCA regulated wastes in Hanford's tank waste system. The signatories agreed that the preferred regulatory pathway would be to exercise the risk-based disposal approval (RBDA) authority under 40 Code of Federal Regulations (CFR) 761.61(c). Key to establishing the Framework Agreement was reaching agreement that several key Hanford waste management units function together as an integrated system for disposal of PCBs. These units include the double-shell tank (DST) system, the 242-A evaporator, the Liquid Effluent Retention Facility (LERF) basins, the Effluent Treatment Facility (ETF), and the waste treatment plant (WTP). Therefore, EPA envisioned a single RBDA approval for the entire disposal system as it relates to management of Hanford tank wastes.

² For tank 241-S-102, Energy's proposal is to use DST supernate derived almost entirely from retrieval from saltcake retrieval of the same tank. For other SST retrievals, DST supernate may be from sources other than the target SST retrieval tank. Regardless of the source of DST supernate with respect to the target SST retrieval tank, all DST supernate is considered equivalent for purposes of evaluating TSCA jurisdiction.

One of the key determinations made by the Framework Agreement was that the content of DSTs would be regulated as PCB remediation waste for purposes of applicability and compliance with TSCA. At the time the Framework Agreement was developed, EPA considered but did not include SST wastes or SST tank systems within the scope of the Agreement, except to the extent that SST wastes are transferred to DSTs as part of retrieval. The basis for this decision is operational history of SSTs indicating the source of wastes in SSTs was likely to be from sources prior to April 18, 1978, and analytical data available at the time the Framework Agreement was developed indicating PCB concentration in the content of SSTs were likely less than 50 parts per million (ppm). Therefore, according to the definition of PCB remediation waste at 40 CFR 761.3, the contents of SSTs are unregulated for disposal under TSCA.

As a consequence of the determinations made through the Framework Agreement, Energy's proposed use of TSCA-regulated DST supernate for retrieval of SST sludge solids constitutes a use of PCBs requiring an authorization under TSCA. As a result, Energy has requested a risk-based disposal approval for the proposed retrieval activities. Given that retrieval of SST wastes is only for purposes of environmental cleanup and associated treatment/disposal of wastes from nuclear weapons production, EPA supports Energy's request to seek approval under the risk-based disposal authority of 40 CFR 761.61(c), rather than a use authorization under 40 CFR 761 Subpart B. Consistent with this distinction, EPA's approval is solely for purposes of environmental cleanup and associated disposal activities.

EPA recognizes that Energy's proposal to use DST supernate for SST retrieval depends on numerous factors, the majority of which are not subject to EPA control under authority of 40 CFR 761.61(c). Therefore, EPA has determined that any approval under 761.61(c) may only logically occur after Ecology has completed its review of relevant documents and information, and provided Energy with a written decision. EPA anticipates that the Ecology decision will be in the form of TWRWP primary document approval pursuant to Section 2.1.3 of the TPA Action Plan Appendix I (or for SST 241-S-102, an F&R document approval pursuant to TPA Milestone M-45-05-T16). As of receipt of the November 19, 2004, RBDA application, only a TWRWP for SSTs 241-C-103 and 241-C-109 has been provided to EPA and Ecology by Energy, Office of River Protection (ORP). Therefore, EPA anticipates that consideration of the RBDA application will occur in a phased approach. Phase I of this approach will cover the overall methodology and risk assessment approach provided in the RBDA application, but will not consider tank-specific data contained in TWRWP documents (or an F&R document for tank 241-S-102). Phase II will be tank-specific, will consider information in the relevant TWRWP or F&R document, and will be initiated only after written documentation that Ecology has approved the corresponding TPA primary document. Implementation of any of the proposed retrieval activities for any particular tank will not be authorized by EPA until and unless both Phase I and Phase II reviews have been completed and EPA has issued a written approval of the RBDA application.

For purposes of cross-program integration, and ensuring complete documentation of the proposed retrieval activities subject to approval under authority of 40 CFR 761.61(c),

EPA is basing its approval determination on the RBDA application submitted on November 19, 2004, as well as the various TWRWP, F&R and other supplemental information that Ecology intended to consider as part of its primary document approval process. Specific supplemental information considered as the basis for this approval is discussed in the remainder of the Statement of Basis and enumerated in the References section. This approach is consistent with authority that EPA has under 40 CFR 761.61(c) to request additional information from any person seeking approval for a risk-based disposal option.

Details of Energy's RBDA application and EPA's evaluation of it are provided in the following sections.

Overview of Energy's RBDA Application

Energy's RBDA application seeks authorization to use TSCA-regulated PCB remediation waste from selected DSTs for purposes of retrieving and/or mobilizing sludge solids from twelve SST tanks. These tanks include 241-S-102 and all C-farm 100-series tanks except for 241-C-106, which has previously undergone retrieval. The application consists of two principal components – a human health and environmental risk evaluation common to retrieval of wastes from all twelve tanks, and tank-specific work plans in the form of either an F&R document, or a TWRWP.

The risk assessment component of Energy's RBDA evaluates both normal operations and selected accidental release scenarios for PCBs associated with waste retrieval. Release mechanisms considered include stack emissions from tank ventilation systems, and accidental releases from valve pit jumper spills and valve pit spray scenarios. As with the 200 Area Liquids Processing Facilities and DST components of the Hanford tank waste Framework Agreement RBDA applications (References 10 and 9, respectively), Energy's application considers the air pathway the dominant release mechanism and exposure pathway for both human and environmental receptors. The application retrieval RBDA application details Energy's methodology to calculate air emissions rates from the three release scenarios evaluated, model transport from the emission point to potential human and environmental receptors, and for evaluating the human health and environmental risks from the emissions.

The tank-specific documentation that is part of Energy's application includes a wide range of information related to equipment associated with retrieval, its configuration and operation, and details of leak detection, monitoring and mitigation (LDMM) plans and expected performance.

Relationship of Energy's RBDA Application to Department of Ecology Retrieval Approvals

As noted in the Background section, Energy's RBDA application and supplemental information considered in this approval are closely related to and contingent upon retrieval approvals issued by Ecology. For purposes of cross-program integration and

ensuring complete documentation of the proposed retrieval activities subject to approval under authority of 40 CFR 761.61(c), EPA is basing its approval determination on the RBDA application, as well as the F&R/TWRWP and additional supplemental information that Ecology intends to consider as part of its primary document approval process.

The RBDA authority of 40 CFR 761.61(c) does not set forth explicit requirements parallel to what RCRA refers to as tank closure. Nevertheless, residual PCB remediation waste remaining in tanks and ancillary equipment that are part of the proposed retrieval activities are subject to consideration in EPA's evaluation of the RBDA application. EPA anticipates that closure activities and requirements developed pursuant to Washington Administrative Code (WAC) 173-303-610, -640, and -800 will provide a basis to demonstrate that the proposed retrieval activities do not pose an unreasonable risk of injury to health or the environment with respect to remediation waste residuals. Documentation of RCRA closure activities and requirements applicable to the twelve SSTs considered by this application are governed by TPA milestone M-45-05A due June 30, 2005 (for tank 241-S-102) and milestone M-45-00B (for the C-farm tanks), due September 30, 2006. Ecology has not received, or has not completed review of this documentation for any of the SSTs addressed by Energy's retrieval RBDA application as of the application date. Therefore, EPA is addressing consideration of retrieval residuals in the RBDA determination through a schedule of compliance condition based on Ecology-approved closure documentation. Although EPA is establishing a clear pathway for RCRA/TSCA integration with respect to consideration of closure documentation, EPA recognizes that it may be more appropriate to satisfy TSCA with respect to post-retrieval PCB remediation waste residuals through technical approaches other than RCRA closure documentation. Therefore, EPA is providing for, but is not strictly requiring, post-retrieval PCB remediation waste residuals to be addressed on the basis of RCRA closure documentation.

EPA acknowledges that TSCA jurisdiction over PCBs in SSTs is established only through use of DST supernate for retrieval purposes. Once PCBs from DST supernate are added to and mixed with existing SST contents subject to retrieval, however, it is essentially impossible to allocate any particular molecule of PCBs to either an unregulated SST source or a regulated DST supernate source. Therefore, EPA considers post-retrieval PCB remediation waste residual management requirements of this approval and the associated no unreasonable risk standard to be applicable to all PCBs in post-retrieval PCB remediation waste residuals.

In addition to the information needs established by Ecology with respect to general retrieval decisions based on F&R/TWRWP documents as defined by the TPA, Ecology has identified a number of considerations specific to the question of whether DST supernate or raw water is best suited to retrieval of SST solids. These considerations, documented in Ecology's July 22, 2004, letter to Energy (Reference 13), require Energy to explicitly justify the potential increased risk of using DST supernate compared to raw water. Ecology's information requirements can be organized as follows:

- System-level performance issues, such as DST space management, evaporator campaign requirements, and DST/SST waste compatibility;
- Monitoring and control issues, such as proposed mass balance methods, air emissions estimates and controls, and leak response plans;
- Environmental impact evaluation, including leak detection, specifically considering high-resolution resistivity (HRR) implementation, and groundwater monitoring.
- EPA approval under TSCA of the proposed use of DST supernate.

Except for the fourth consideration above, which references this PCB-specific determination, Ecology's supernate-specific considerations broadly consider all aspects of supernate use within the scope of Ecology's authorized dangerous waste program and applicable state law. EPA believes that Ecology's considerations provide a sound basis for discriminating between using raw water versus DST supernate for SST retrieval under both RCRA and TSCA. Further, EPA believes that a broad, not just PCB-specific, consideration will result in sound, defensible decision with respect to DST supernate use. Therefore, EPA intends to incorporate these supernate-specific considerations into its TSCA decision by reviewing Ecology's findings with respect to the July 22, 2004, letter considerations. Ecology has approved Energy's proposal to use DST supernate for retrieval of tank 241-S-102 via its approval of the corresponding F&R primary document approval (References 20 and 26). On this basis, EPA has proceeded to evaluate Energy's entire RBDA application according to the no unreasonable risk standard of 40 CFR 761.61(c)(2).

As noted in Ecology's July 22, 2004, letter, DST supernate considerations are tank-specific, and are to be included in applicable TWRWP documents (or supplemental information in the case of the S-102 F&R documentation). Therefore, final EPA evaluation of these considerations will be part of tank-specific Phase II TSCA approvals. EPA does note, however, that justifications for use of DST supernate provided by Energy for tanks 241-S-102 and 241-C-103/109 (Reference 15) are likely to be common to all twelve SST retrieval candidates. These include significantly reduced total volume of retrieved wastes that must be managed by the DST system, significantly reduced number of evaporator campaigns necessary to support retrieval schedules, and significantly increased operating efficiency of the DST systems (due in part, of course, to reduced reliance on evaporator campaigns for DST space optimization). Energy also documents significant reduction in the amount of sodium hydroxide likely needed to meet the minimum chemistry limit for DST corrosion mitigation purposes. If raw water were used for retrieval, approximately 11,000 gallons of 19 molar (50 wt. percent) sodium hydroxide would have to be added to the DST tank system. Since the sodium content influences waste loading of wastes to be vitrified by the Hanford Waste Treatment Plant, Energy predicts that this quantity of sodium hydroxide addition corresponds to an additional 18 metric tons of sodium, an additional 170 metric tons of immobilized low activity waste (ILAW) glass, or about thirty additional waste containers. See Attachment 2 to 04-TPD-102 (Reference 15). EPA believes that these factors provide strong support for use of DST supernate in lieu of raw water.

EPA's evaluation of Energy's application

As noted in the previous section, EPA has determined that any approval under 761.61(c) may only logically occur after Ecology has completed its review of relevant documentation. As of the November 19, 2004, application date of Energy's RBDA application, Ecology has not yet issued any primary document determinations related to retrieval of the twelve SSTs considered by the RBDA application³. Therefore, it is not possible for EPA to make a complete determination with respect to Energy's RBDA application at this time, and it is appropriate for EPA to make a complete approval determination in a phased manner. Phase I of this approach covers the overall methodology and risk assessment approach provided in the RBDA application, but does not consider the tank-specific data contained in TWRWP documents (or the F&R document for tank 241-S-102). Phase II of this approach is tank-specific and considers information in the relevant F&R or TWRWP document(s). Implementation of any of the proposed retrievals will not be authorized by EPA until and unless both Phase I and Phase II reviews have been completed and EPA has issued a written approval for each phase.

Although much of the methodology in Energy's retrieval RBDA application is consistent with, if not directly transferred from the 200 Area Liquids Processing Facility and the DST components of the Framework Agreement RBDA, this RBDA application and EPA's review of it is separate from the Framework Agreement RBDA and its implementation. EPA's decision to review this retrieval RBDA as a stand-alone application rather than treat it as a component of the Framework Agreement RBDA is a policy distinction, not one driven by regulatory requirements. EPA's basis for making this distinction is that the policy objectives of the Framework Agreement do not extend to the Energy's proposal to use DST supernate for SST retrieval, and EPA does not find it necessary to re-open the Framework Agreement to include SST retrieval activities or use of supernate in SSTs for purposes of retrieval as a means to accomplishing Framework Agreement objectives.

As a basis for distinguishing between the scope of Energy's retrieval RBDA application and the Framework Agreement RBDA, EPA is establishing the boundary between the two RBDAs as the point of connection between retrieval transfer lines and the corresponding DST valve pit. Equipment and management of wastes between the DSTs and the SSTs are within the scope of this retrieval RBDA. The DST valve pit itself, as well as all operations associated with DSTs, including ventilation systems, in-tank pumps, and all instrumentation associated with the DST are considered within the scope of the Framework Agreement DST RBDA. This distinction between the two RBDAs is consistent with the Framework Agreement, which considers DSTs as the initial step in the overall tank waste treatment system. EPA is still in the process of reviewing the DST components of the Framework Agreement RBDA application.

³ As noted in the previous section, Ecology subsequently issued the tank 241-S-102 F&R primary document approval on December 13, 2004 (Reference 23), but not for the remaining C-farm tanks addressed by the retrieval RBDA application.

The scope of EPA's Phase I approval includes consideration of exposure mechanisms that are considered on the basis of explicit risk evaluation, and that are common to the entire suite of SSTs covered by Energy's RBDA application. Based on information in Energy's RBDA application, EPA has concluded that Phase I review should focus on normal operational emissions from ventilation stacks, and air emissions from selected accidental release scenario. Phase I evaluations consider the effects of these emissions on human health and environmental receptors.

Phase II tank-specific evaluations focus on the potential for releases from SSTs undergoing retrieval, and from transfer lines and other equipment associated with retrieval activities. Energy's TWRWP/F&R documents follow different approaches for addressing potential releases from SSTs compared to the remaining retrieval equipment. This distinction is based on the inability to prevent releases from SSTs through secondary containment, and limitations on the minimum release volume that can be identified using current leak detection technology.

Phase I Review Evaluation

As noted above, the Phase I evaluation of Energy's RBDA application focuses on a risk evaluation of air emissions from the proposed retrieval activities. Energy's application considers the following aspects of PCBs during SST waste retrieval operations:

- Ventilation stack emissions from normal SST waste retrieval operations;
- Accidents that may release PCBs to the environment during representative accidental or upset conditions using a valve pit jumper spill and valve pit spray scenarios;
- Human health and environmental receptor locations;
- Risks of PCBs to the identified human health and environmental receptors.

Other elements of the retrieval RBDA application, such as risks of accidental releases from pipes, hoses and transfer equipment and risks from accidental releases from SSTs undergoing retrieval, are addressed on a tank-specific basis in Phase II approvals. In all cases, EPA's evaluation of risks is based on the demonstration of no unreasonable risk of injury to health or the environment, as required by 40 CFR 761.61(c)(2).

Air Emissions Evaluation

Section 3.2 of Energy's RBDA application documents that the air pathway is the only complete pathway with the potential to pose risks to surrounding populations of workers and the public during retrieval operations subject to this approval, considering normal SST tank ventilation systems and representative accidental release scenarios. Energy's RBDA application provides conservative, bounding estimates of air emissions of PCBs via ventilation system emissions. Given the heterogeneous nature of wastes remaining in SSTs and the complex emissions mechanisms associated sluicing-based retrieval technologies, Energy's application bases emissions estimates from the SST ventilation systems on deterministic, not mechanistic calculations. The quantity of PCBs in SST

solid wastes (sludge) is taken from the maximum concentration of existing analytical data, available for seven of the twelve SSTs (sludge data from 241-S-102, 241-C-101, 241-C-102, 241-C-105, 241-C-107, 241-C-108 and 241-C-111). These upper bound numbers are taken as representative of the entire set of SSTs. For C-farm tanks, this inventory is based on a solid waste PCB concentration of 37 mg/kg, an upper bound based on data from tank 241-C-111, and for tank 241-S-102, 7 mg/kg. As noted in Appendix A of the RBDA application, tank waste PCB data are taken from the "Tank Waste Information Network System," or "TWINS," which can be accessed at <http://twins.pnl.gov/twins3/twins.htm>.

There is some possibility that PCB concentration in some C-farm tanks for which solid waste analytical data are not available might exceed the 37 mg/kg concentration. Two factors, however, lead EPA to conclude that use of this concentration is not unreasonable for air emissions risk evaluation. First, the C Tank Farm contains twelve 100-series tanks, grouped in four three-tank cascades (241-C-101 through 241-C-103, 241-C-104 through 241-C-106, C-241-107 through 241-C-109, and C-241-110 through C-241-C-112). This cascading design suggests that the waste in any one tank in a cascade series should be related to the wastes on the other tanks within the cascade. Even if differences exist between tanks within a cascade series, these differences are likely less than if the tanks received wastes from unrelated sources. Further, actual analytical data are available for at least one tank in each of the four three-tank cascade series, reinforcing the thesis that available data are representative of wastes from the entire tank farm. Second, there is sufficient conservatism in how these data are applied to emissions (and subsequently risk calculations) that EPA does not consider it unreasonable to accept data points as the basis for Energy's demonstration that the proposed retrieval activities do not pose an unreasonable risk of injury to health and the environment.

For DST supernate to be used for retrieval of C-farm tanks, Energy's RBDA application assumes a concentration of 65 $\mu\text{g/l}$ in liquid supernate, based on supernate data from tank 241-AW-104. This value represents an upper-bound value of available DST supernate data (see Section 1.3.1 of the RBDA application). EPA interprets this value as a solubility-limited concentration in solids-free supernate. It is possible that the actual PCB concentration in DST supernate during retrieval could be higher if there is incomplete separation of supernate and retrieved solids. Settling efficiency in receiving DSTs may be enhanced through appropriate equipment design – this question will be evaluated on a tank-specific basis through Phase II approval analyses. EPA may impose monitoring or other conditions to ensure that actual field practices (and thus actual risks) are within the bounding analyses presented in the RBDA application.

The basis for Energy's evaluation of ventilations system emissions is in Section 2.3.1 of the retrieval RBDA application. These emissions calculations assume the entire PCB inventory of the SSTs considered is released over a two-year period (one-year period in the case of S-102, since retrieval of the single S-102 tank is expected to be completed prior to the remaining 11 C-farm tanks over a longer, 2-year period). From these simplified, highly conservative assumptions, a PCB release rate of 2.42×10^{-3} g/sec. for tank 241-S-102 and 5.44×10^{-4} g/sec. for C-farm tanks (aggregate) results. As a measure

of how conservative this bounding estimate may be, simplified equilibrium calculations can be performed as follows.

Assumptions: Ventilation flow rate = 1000 ft³/min.
 Vapor phase PCB concentrations can be calculated via Henry's law equilibrium
 The entire ventilation flow rate is at equilibrium PCB concentration (implicitly assuming instantaneous mass transfer of PCBs from liquid to vapor)
 Liquid phase PCB concentration = 65 µg/l (bounding for C-farm tanks)

From these calculations, a PCB flow rate of 4.42×10^{-11} g PCB/sec. results. This number represents a reasonable upper bound on PCB vapor emissions based on a simplified mechanistic analysis. Therefore, the assumed PCB release rate based on total inventory may over-estimate PCB emissions by several orders of magnitude. A calculation summary of these equilibrium calculations may be found in the file memorandum dated December 28, 2004 (Reference 14).

EPA believes that this is a highly conservative estimate for additional reasons. PCBs are principally associated with solids. If PCBs were to be emitted via the ventilation systems, they would either have to undergo mass transfer from the solid phase into the liquid phase, and thence into the vapor phase, or be dispersed into sufficiently small aerosol particles to be entrained into the ventilation air stream. Under the first mechanism (mass-transfer limited), mass transfer rate limitations and equilibrium limitations would significantly reduce vapor PCB emissions from those calculated based on bounding calculations, given the fixed time duration of the proposed activities (2-3 months/tank, overall 1-2 years). Were the retrieval activities of infinite duration, these rate and equilibrium limitations would, of course, not serve to reduce the mass quantity or concentration. Energy's RBDA application documents these findings as follows:

"The model assumes that all SST solid waste and DST supernate has a homogeneous PCB concentration. No consideration was made concerning the kinetic and diffusion characteristics associated with the transfer of PCBs from the solid to the liquid to the vapor space. The actual kinetic and diffusion characteristics would be expected to be much slower [than calculated based on emissions over the stated 1-2 year period for retrieval] and would not support a consistent high release of PCBs."

In the case of aerosol generation, the available kinetic energy of retrieval technologies (water sprays) would likely not be sufficient to create significant aerosol-sized particles from tank sludge solids. Even if aerosol particles were generated, HEPA filters in the SST ventilation systems would reduce actual emissions by 99.95% of particulate matter with a median diameter of 0.3 µm⁴. Control of gaseous and particulate discharges is

⁴ The 99.95% control efficiency is pursuant to ASME/ANSI N510, Testing of Nuclear Air Treatment Systems, incorporated by reference into WAC 246-247-130 Appendix C.

documented as one of the functions and requirements of retrieval activities, as well as radioactive air emissions Notices of Construction orders applicable to SST ventilation systems. See, for example, Table 11 in the C-103 and C-109 TWRWP. Acknowledging that there are not supporting mechanistic calculations for aerosol waste emissions, EPA does not believe it unreasonable to conclude that the conservative bounding estimates in Energy's ventilation system PCB emissions calculations, coupled with requirements for HEPA filtration of ventilation system air emissions, overestimate actual emissions by two or more orders of magnitude.

Emissions from valve pit jumper change-out leaks and valve pit spray release are documented in Sections 2.3.2 and 2.3.3 of the retrieval RBDA application. These scenarios are taken from the DST portion of the Framework Agreement RBDA application. Although based on numerous assumptions, the calculations are mechanistic and the assumptions reasonable. EPA considers the resulting emissions estimates reasonable, if not highly conservative.

Additional discussion of assumptions and uncertainty on model assumptions underlying estimates of PCB release rates to the vapor transport pathway are found in Table 2-2 of the RBDA application. This analysis concludes that in all instances, assumptions and consideration of associated uncertainty yield estimated emissions used in the risk analysis that are higher (thus more conservative in terms of risk calculations) than likely actual emissions.

Evaluation of Other Emission Pathways

Energy's RBDA application does not calculate risks from operational (that is, normal or non-upset condition) management of PCB remediation waste in pipes or tank ancillary equipment. Rather, the application's demonstration of no unreasonable risk of injury to health and the environment is based principally on use of RCRA-compliant (that is, equipped with secondary containment) transfer lines and equipment, supplemented by leak detection and inspection requirements, as well as a tank-farm emergency response plan. Details of specific transfer lines and ancillary equipment, and documentation that such equipment satisfies RCRA secondary containment requirements may be found in the various TWRWP/F&R documents and the corresponding Phase II RBDA approvals. Given the relatively short duration of individual retrievals, EPA concludes that this approach based on a combination of preventative measures, including secondary containment, leak detection, and inspection requirements for transfer lines and ancillary equipment is sufficient, with respect to such equipment, to demonstrate that the proposed use of PCB remediation waste does not pose an unreasonable risk of injury to health and the environment.

Similarly, Energy's RBDA application does not explicitly calculate risks from potential releases of PCB remediation waste from the twelve SST tanks undergoing retrieval. As noted in Section 1.0 of the RBDA Application, Energy is not proposing to introduce regulated PCB remediation waste into SSTs that are known or suspected "leakers" (specifically, tanks 241-C-101, 241-C-105, 241-C-110, and 241-C-111). For these tanks,

the question of potential retrieval releases from the SSTs themselves is moot. With respect to the remaining eight SSTs, EPA concurs with the iterative approach adopted by Energy in the RBDA application via the various TWRWP/F&R documents. This approach can be viewed as having four principle components:

- Pre-retrieval evaluation of principle risks (based on accounting for at least 95% of the total risk from retrieval leaks via the groundwater pathway), based on reasonable assumptions of minimum detectable retrieval leaks;
- Real-time monitoring of retrieval leaks for purposes of retrieval process control, based on pre-retrieval risk evaluations;
- Post-retrieval characterization of both in-tank residuals and potential ex-tank releases (releases from SSTs undergoing retrieval), and evaluation of risks from each;
- Mitigation of risks from ex-tank retrieval releases and allowable in-tank retrieval residuals through the approved final component closure activities and waste management area closure requirements.

In this Phase I approval, EPA is approving this framework for evaluating the no unreasonable risk criteria of 40 CFR 761.61(c)(2). EPA will evaluate the particulars of these four elements in the tank-specific Phase II approvals, since the necessary data to do so is contained in the various TWRWP/F&R documents. EPA does not believe this approach unreasonable, considering a number of factors intrinsic to the SST system, and the overall approach to retrieval established by Ecology and documented in Appendix I of the Tri-Party Agreement.

EPA notes that PCBs may or may not be explicitly included in pre-retrieval risk evaluations or the real-time monitoring for releases during retrieval. EPA believes that this is appropriate in the specific context of SST retrieval with respect to evaluating the no unreasonable risk criteria of 40 CFR 761.61(c)(2), given that PCBs are not expected to be a significant risk contributor compared to radionuclides or other chemical constituents of SST wastes, and that any pre-retrieval estimate of risks from PCBs due to retrieval leaks would be so uncertain or dependant on assumptions as to be unsuitable for decision-making. EPA will not issue a Phase II approval for use of DST supernate for retrieval if Ecology does not approve its use based on the TPA Appendix I requirements or supplemental information based on the July 22, 2004, letter. An EPA concurrence under TSCA authority with an Ecology approval of retrieval based on use of DST supernate is expected to reflect a conclusion that the minor risk contribution of PCBs to retrieval risks from tank leaks during retrieval is sufficient to demonstrate that the proposed activities satisfy the no unreasonable risk criteria of 40 CFR 761.61(c)(2). EPA will make this Phase II TSCA evaluation of no unreasonable risk in the context of existing TPA agreements and schedules to conduct retrieval of wastes from SSTs and complete closure of the SST tank systems - in essence, EPA may accept some short-term retrieval risk as a not unreasonable means to limit or eliminate the long-term risks of leaving SST wastes in place.

PCBs are not expected to be a contributor to risks via the groundwater pathway. Section

3.2 of Energy's RBDA Application documents that the basic mechanisms governing the migration of PCBs in the vadose zone are such that PCBs potentially released from SSTs would not be expected to reach groundwater. Essentially, this argument examines the vadose zone modeling parameter K_d , which is the ration of contaminant in the solid phase of the vadose zone per mass of solid phase divided by the concentration of solute in solution. According to Energy's RBDA application, tank farm risk modeling has consistently shown that long-term groundwater impacts and associated human health risks are driven by the highly mobile ($K_d=0$) contaminants. Contaminants with K_d values of 1 mL/g or greater have been consistently shown not to transit the vadose zone (i.e., do not break through to the groundwater table) within the 10,000-year simulation period typically used for tank farm risk evaluation. Contaminants with K_d values of 0.6 mL/g break through to groundwater, but only late in the simulation period, and therefore make little or no contribution to risk at the time of peak groundwater concentration, which for retrieval leaks is projected to occur approximately 100 years after tank farm closure. The application further documents that the K_d expected for PCBs in the tank farm leak evaluation is 92.7 mL/g, well above the heuristic threshold value of 0.6 mL/g. Based on this modeling approach, EPA concurs with Energy's conclusion that PCBs associated with retrieval leaks are not expected to have an impact via the groundwater pathway.

To be sure, potential releases of PCBs to the environment during SST retrieval could pose risks through exposure pathways other than groundwater – for example, intruders into the tank farm area after closure could be exposed to PCBs (as well as other chemical or radionuclide contaminants) remaining in soils. Given the extremely limited experience to date with SST retrieval, and uncertainty in the size of leak that can be detected by current or expected real-time leak detection technology applicable to retrieval activities, direct evaluation of risks from PCBs (or any other constituents) is far too uncertain prior to completion of retrieval to be used for decision-making purposes (specifically including evaluation of the no unreasonable risk criteria of 40 CFR 761.61(c)(2)). Moreover, in the case of SSTs, risks from retrieval leaks are likely to be controlled by constituents other than PCBs. Therefore, EPA concludes that the selection of release mechanisms and exposure pathways discussed above is adequate for demonstrating that the proposed retrieval activities do not pose an unreasonable risk of injury to health or the environment.

EPA expects that post-retrieval characterization will include explicit sampling and analysis for PCBs, as will applicable component closure activity work plans and waste management area closure plans (should such plans be used as the basis to address post-retrieval PCB remediation waste residuals). If necessary, EPA will include explicit conditions in its Phase II determination to ensure the necessary data are available.

Finally, it is appropriate to note that existing data clearly demonstrates that the highest concentration of PCBs is expected to be in sludge solids already in SSTs (indeed, the very wastes being retrieved), not the aqueous supernate that is the regulatory driver for requiring an RBDA approval. In other words, should a release from an SST occur during retrieval, it is likely that the highest contribution to risk would be from the unregulated

PCBs already in SSTs, not from the regulated DST supernate. In this respect, the risks from sludge solids PCBs during retrieval are identical whether raw water or regulated DST supernate is used for retrieval mobilization. Whatever marginal risk from PCBs might occur from use of supernate versus raw water is likely to be small compared to the “base” risk from sludge solids already in SSTs. With respect to this consideration, these marginal risks associated with use of DST supernate are not unreasonable when considered in the context of very significant savings of DST space and reduction in sodium addition for corrosion mitigation required by raw water use.

Human Health Risk Evaluation

Energy’s RBDA application calculates human health risks from retrieval system air emissions for three receptors, consistent with the 200-Area Liquid Waste Processing Facilities RBDA application (See Reference 10)). These receptors include a State Highway 240 commuter, a Ringold resident, and a maximally-exposed on-site worker. Additional details of the human health risk evaluation assumptions and methodology can be found in Section 3.4 of Energy’s RBDA application.

Table 4-2 of the application summarizes human health risks from the proposed PCB management activities. No excess cancer risks from exposure to PCBs via the identified air emissions mechanisms exceed 3.9×10^{-6} , so EPA concludes that the emissions mechanisms and exposure pathways evaluated result in no unreasonable risk of injury to human health. This conclusion is supported by the discussion above that concludes that PCB emissions upon which human health risk calculations are based overestimate PCB emissions by several orders of magnitude. In addition, the discussion of uncertainty in Section 3.5 of the RBDA application demonstrates that assumptions and calculation methodology underlying human risk evaluation is consistently conservative, and are expected to over-estimate human health risks. Finally, EPA notes that risk calculations are based on Aroclor mixture risks, not congener-specific PCB toxicity, for the reasons documented in the 200-Area Liquids Processing Facility RBDA approval. See the document entitled “Analysis of Co-Planar PCBs in Hanford Tank Wastes,” Reference 12.

EPA notes that Energy’s RBDA application does not examine two potential human exposure scenarios which could be significant with respect to PCBs. These include a food chain bioaccumulation scenario, and a combined worker/resident scenario. Given the limited duration of the proposed retrieval activities, and the fact that no agricultural activities will occur within the Hanford Federal Facility during retrieval, EPA considers it highly unlikely that food chain bioaccumulation will be a significant risk contributor.

A combined worker/resident exposure scenario is in fact likely to occur. Although workers are not expected to be residents in the Hanford 200 Area during the duration of this approval, workers can and do live relatively near to the Hanford site. The risk calculations performed for worker-only and for resident-only scenarios, however, clearly demonstrate that resident exposure scenarios present at least an order of magnitude lower risk than worker exposure scenarios. Even if explicit calculations of a combined

worker/resident scenario were performed, the calculated risks would not differ significantly from those derived from the worker-only scenario already considered.

Finally, EPA notes that the science of evaluating early-childhood exposure to carcinogens embodies considerable uncertainty. To verify the conclusions reached by the RBDA application with respect to the risks from a nursing mother exposure scenario, EPA evaluated the corresponding exposures according to the criteria proposed in the EPA "Region 6 Risk Management Addendum – Draft Human Health Risk Assessment Protocol for Hazardous Waste Combustion Facilities," EPA-R6-09-003, July, 1998, available at <http://www.epa.gov/ncea/raf/cancer2003.htm>. This document recommends comparing the child exposure to an average infant background dose of 50 picograms/kg-day. For emissions from C-farm ventilation stacks (the most significant air source), a value of 1.14 picograms/kg-day is cited. Multiplying by the body concentration factor of 1.7 as cited in the RBDA application, the infant exposure is 1.9 picograms/kg-day results, well within the infant background exposure dose. Therefore, EPA concludes that risks of the proposed activity are not significant with respect to the nursing infant exposure scenario, and do not pose an unreasonable risk of injury to health or the environment.

Environmental Risk Evaluation

Energy's RBDA evaluation of environmental risks is based on the methodology proposed in the DST component of the Framework Agreement RBDA application. While EPA has not completed its evaluation of the DST component application, Table 5-1 of the SST retrieval RBDA application documents Energy's conclusion that environmental receptor risks are several orders of magnitude below both species-specific and EPA hazard quotients with respect to the air exposure pathway. EPA is accepting the analysis in Energy's SST retrieval RBDA application as sufficient on an interim basis to demonstrate satisfaction of the no unreasonable risk criteria of 40 CFR 761.61(c)(2) with respect to environmental receptors. This conclusion is further reinforced by the very conservative nature of PCB emissions estimates and exposure pathway evaluation noted above with respect to human health risks. Should EPA's review of the DST component of the Framework Agreement RBDA lead to the conclusion that Energy's environmental risk evaluation methodology is flawed or inadequate, EPA reserves the right to require revisions to Energy's environmental risk evaluation, or to cease retrieval activities subject to this approval should they pose an unreasonable risk of injury to the environment.

Phase II Review Evaluation – Tank 241-S-102

As noted in the Phase I review evaluation, the tank-specific component of Energy's retrieval RBDA application is in the form of a Functions and Requirements (F&R) document for tank 241-S-102, coupled with supplemental information related to use of DST supernate. Since the F&R document lacks the specificity and detail of more recent Tank Waste Retrieval Work Plan (TWRWPs), Energy has provided and EPA has considered a range of supplemental information with respect to tank 241-S-102. Briefly, EPA has considered the following factors in its Phase II evaluation of tank 241-S-102:

- Basic justification for use of DST supernate;
- Technical standards applicable to equipment used for retrieval external to tank 241-S-102, including inspection, monitoring and response procedures with respect to transfer equipment;
- Waste compatibility between wastes to be retrieved and DST supernate;
- Leak Detection, Monitoring and Mitigation requirements for 241-S-102 during retrieval;
- Post-retrieval characterization of residuals remaining in tank 241-S-102.

Energy has provided a brief outline of benefits and risks of using raw water versus DST supernate for purposes of retrieving solid waste/sludge from tank 241-S-102 in the response to Ecology's request for supplemental information relating to use of DST supernate for tank 241-S-102. See Reference 17. EPA finds that the significant savings in DST space documented for use of supernate versus raw water, coupled with the reduction in sodium [hydroxide] addition required for DST corrosion control in the case of raw water use provides an adequate basis for finding the risk differential between raw water and supernate use does not pose an unreasonable risk of injury to health or the environment. EPA notes that its consideration of this point has two components: a finding that the use of DST supernate itself does not pose an unreasonable risk, and a finding that the risk differential between use of raw water and supernate does not pose an unreasonable risk. The comparison of risks and benefits of using raw water versus DST supernate provided by Energy addresses the second component. The remainder of this approval and the accompanying analysis addresses the first component.

EPA's approach to ensuring that potential leaks from equipment used for retrieval (other than tank 241-S-102) are prevented to the degree necessary to demonstrate that they do not pose an unreasonable risk is based on application of RCRA technical standards found in 40 CFR 265.191 through 196. EPA is applying these standards under TSCA authority in partial satisfaction of the requirements of 40 CFR 761.61(c), not under the statutory authority of RCRA Section 3005(e). This approach is consistent with Section 2.2, Table 2-2 of the S-102 F&R document.

These standards address key elements related to protective operation of such equipment, including design and installation of the equipment, secondary containment requirements, operating and inspection requirements, and response to leaks or spills. EPA notes that pits (such as the SY-02A pit) themselves are not required to have secondary containment, since the pits serve as secondary containment for the transfer lines, valves, etc., located in them.

Waste compatibility issues for retrieval of wastes from tank 241-S-102 have been evaluated in "Waste Compatibility Assessment of Tank 241-S-102 Retrieval Waste (SST-R-04-01) with Tank 241-SY-102 Waste," RPP-20229, dated April 27, 2004, Reference 21. This document, however, addressed only "Phase 1" saltcake dissolution/retrieval from tank 241-S-102 – it neither addressed solid waste/sludge retrieval, nor use of DST supernate for retrieval purposes. The document "Additional Information for State of Washington, Department of Ecology Supporting the Use of

Recycled Supernate in retrieving Tank 241-S-102,” Reference 17, notes in item 3 that a waste compatibility assessment for supernate recycle is not complete at this time, but will be available prior to initiating the transfers. The document further notes that since the majority of the Tank 241-SY-102 supernate that will be used in the recycle phase will originate in Tank 241-S-102, Energy does not anticipate any significant waste compatibility issues associated with supernate recycle. In their December 13th letter approving the Tank 241-S-102 Functions and Requirements document (References 20 and 26) and use of DST supernate for retrieval of tank 241-S-102 wastes, Ecology conditioned their approval on the requirement:

“The waste compatibility assessment for supernate recycle will be completed and reported to Ecology after phase 1 [saltcake dissolution], retrieval of saltcake with raw water, but before phase 2 [solid waste/sludge sluicing] retrieval using recycled supernate.”

EPA does not expect waste compatibility issues to arise between Phase 1 and Phase 2 retrieval activities, at least with respect to PCBs, but does believe it prudent to formally perform the compatibility assessment as required by Ecology. EPA is therefore including a similar condition in this RBDA Phase II determination to require submission of the completed assessment to EPA. EPA may then modify or revoke the RBDA approval should the assessment document compatibility issues that demonstrate the proposed retrieval activities may pose an unreasonable risk of injury to health or the environment.

Leak detection, monitoring and mitigation (LDMM) with respect to potential releases from tank 241-S-102 during retrieval is of key environmental significance, particularly in connection with use of regulated DST supernate. The tank 241-S-102 Functions and Requirements document describes application of both in-tank and ex-tank⁵ leak detection for purposes of LDMM. With respect to leaks from tank 241-S-102 itself, applicable techniques include static water level monitoring, and monitoring/logging of dry wells surrounding the tank. In addition, routine process control data from flow meters, level gauges and density measurements, such as those described in Figure 1 of Reference 17 can be used as indicators of gross or catastrophic leaks. Energy has asserted in Section 5.2.2 of the tank 241-S-102 F&R document that these technologies are those that are “technically mature and capable of being deployed in the tank farm in a manner that supports waste retrieval schedule and operational performance and reliability requirements.”

Energy has also noted in Section 5.4.5 of the tank 241-S-102 F&R document, and in an email (Reference 16) that a pilot deployment of a more sensitive leak detection technique, high-resolution resistivity (HRR), is planned for tank 241-S-102 retrieval. More specifically,

⁵ In-tank leak detection may include techniques such as level monitoring and mass balance calculations. Ex-tank leak detection includes techniques such as dry-well logging, and potentially high-resolution resistivity, both of which measure parameters physically exterior to the tank in question.

"HRR is being used in a demonstration mode on S-102 in addition to the primary leak detection method, drywell monitoring. Following the completion of retrieval there will be an Ecology-approved test done where one of the drywells is used to inject a specified volume of sodium thiosulfate into the ground at a specified rate to observe the HRR response. "

Via letters of July 19 and 27, 2004 (References 24 and 25), Ecology has provided approval to Energy of an HRR test plan, RPP-17191, Rev. 1, for field testing and evaluation of the HRR system at tank 241-S-102. EPA is not reviewing or approving of this test plan as a basis for this RBDA approval. EPA (in coordination with Ecology) will, however, consider this test plan and the associated demonstration test results. Data from the test may provide insight into retrieval performance of tank 241-S-102, and a basis to EPA to require implementation of HRR leak detection at future SSTs included in Energy's RBDA approval. EPA is requiring inclusion of available data from the HRR test in the post-retrieval report, and for submission of the final test report. See Conditions 5 and 10 of the tank 241-S-102 Phase II approval. These conditions are consistent with requirements included in Ecology's July 19th letter (Reference 24).

Given the pilot nature of deploying HRR technology during tank 241-S-102 retrieval, EPA does not believe it appropriate to rely exclusively on HRR data for LDMM purposes. EPA will, however, evaluate findings of the pilot deployment, and may (as Ecology may do as well) require application of HRR technology as a condition of future retrievals requiring approval under the requested RBDA.

Measurement and characterization of residual waste remaining in tank 241-S-102 after completion of retrieval activities is critical to evaluate potential environmental impacts of retrieval activities, define any mitigation measures that may be required, and to define the nature and scope of closure activities required under RCRA and residual management under TSCA. Such activities may be performed under either TPA Appendix H procedures, should Energy choose to seek an exception to Appendix H retrieval requirements, or as part of closure activities under TPA Milestone M-45. Although such activities and data are critical to the required TSCA demonstration of no unreasonable risk of injury to health or the environment required by 40 CFR 761.61(c), EPA is not imposing explicit residual or sampling requirements as part of either Phase I or Phase II reviews or determinations. Rather, EPA is electing to require such information to be obtained and included in the plans and schedules to be submitted by Energy to address management of residual PCB remediation waste. EPA will expect these submissions to address PCB remediation waste residuals both within tank 241-S-102 (retrieval residuals), potential leak residuals, residuals in transfer equipment and ancillary equipment, as well as spills/releases that may have occurred from such equipment.

EPA is not requiring characterization or sampling of retrieved wastes placed in tank 241-SY-102 as part of this RBDA approval. While these data will clearly be needed and consistent with the expectation of the Framework Agreement (see item 6 of Reference 8), such activities are outside the scope of this RBDA approval, and are more properly addressed as part of the DST component of the Framework Agreement RBDA. Prior to issuing a determination regarding the DST component of the Framework Agreement

RBDA, EPA notes it may be advantageous for Energy to complete a representative characterization of wastes and retrieved wastes placed in tank 241-SY-102 during the course of tank 241-S-102 retrieval activities.

Discussion of conditions

Phase I (General) Conditions

- 1) Energy shall conduct all retrieval activities in accordance with TWRWPs (or an F&R document in the case of tank 241-S-102), as approved by the Washington State Department of Ecology as TPA primary documents.

The purpose of this condition is to ensure that field activities are consistent with the basis for EPA's approval. EPA is establishing this condition on the basis that, as a whole, work as authorized pursuant to the cited Tri-Party Agreement (TPA) primary documents forms in part the basis of EPA's finding that the approved retrieval activities do not pose an unreasonable risk of injury to health or the environment. In some instances, EPA has identified specific elements of TWRWPs (or an F&R document) of particular relevance to the TSCA no unreasonable risk standard. In such instances, EPA has established specific conditions with respect to those particular elements. Where overlap exists between this general Phase I condition and any more specific condition, EPA intends that compliance with this approval be based on the most specific condition.

- 2) Energy shall maintain air emissions control on single-shell tank ventilation systems during retrieval activities subject to this approval according to the requirements of the Washington State Department of Health Radioactive Air Emissions Notice of Construction Approval AIR-04-503 (for tank 241-S-102) and AIR-04-1102 (for C-farm tanks).

The purpose of this condition is to ensure potential PCB exposures via the air emissions pathway do not pose an unreasonable risk of injury to health or the environment, as discussed in the section "Air Emissions Evaluation." In establishing this condition, EPA notes that these NOC approvals (References 22 and 23) require ventilation stacks to be equipped with high efficiency particulate air (HEPA) filters capable of reducing particular air emissions by a minimum of 99.95 percent. EPA understands that at least the AIR-04-1102 NOC approval is subject to revision by the Washington State Department of Health. Such revisions are acceptable with respect to compliance with this condition provided that the abatement technology and attendant minimum air emission reduction standard required by any revised NOC approval remain no less stringent than required by the cited Approvals.

- 3) Nothing in this approval relieves Energy of any obligation to comply with all other rules and regulations applicable to the retrieval activities documented in the TWRWP (or F&R in the case of tank 241-S-102) approved as a TPA primary document.

As noted in the Statement of Basis and in EPA's letter of December 9, 2004, the proposed retrieval activities are subject to numerous considerations, not all of which are subject to

EPA control under the authority of 40 Code of Federal Register (CFR) 761.61(c). This condition reflects EPA's acknowledgement that success and environmental performance must reflect compliance with all applicable requirements.

- 4) If anytime before during or after management of PCB remediation waste for SST retrieval, Energy possesses or is otherwise made aware of any data or information (including but not limited to site conditions that differ from those presented in the November 19, 2004, RBDA application or cited as the basis for this approval) indicating that retrieval activities approved herein may pose an unreasonable risk of injury to health or the environment, Energy must report such data, via facsimile or e-mail to EPA according to Phase I Condition 6 within five working days, and in writing to the Regional Administrator within 30 calendar days, of first possessing or being made aware of that data. Energy shall also report new or different information related to a condition at any element of the SST systems associated with the approved retrieval activities if the information is relevant to this approval. Energy shall immediately cease all retrieval activities approved herein that may pose an unreasonable risk of injury to health or the environment. Such activities shall not resume until written approval is obtained from EPA that finds the activities in question no longer pose an unreasonable risk of injury to health or the environment.

This condition is intended to ensure an affirmative obligation on the part of the applicant to both report data or information to EPA that could influence EPA's evaluation of compliance with the TSCA no unreasonable risk standard, and to cease those activities that may pose an unreasonable risk. EPA does recognize that in certain instances related to SST retrieval, identification of a condition that clearly poses an unreasonable risk, such as a gross leak from an SST undergoing retrieval, might require continuation of certain activities such as pumping of free liquids out of a leaking tank to mitigate risks. EPA specifically intends that the cessation clause of this condition be interpreted to allow those authorized retrieval activities related to safety or risk mitigation to continue when some aspect of retrieval may pose an unreasonable risk of injury to health or the environment.

- 5) EPA reserves the right to modify or revoke this approval based on information provided pursuant to Phase I Condition 4, or any other information available to EPA that provides a basis to conclude that the retrieval activities covered by this approval pose an unreasonable risk of injury to health or the environment.

The purpose of these conditions is to ensure that all activities for the duration of retrieval activities (including any post-retrieval management of PCB remediation waste residuals) continue to pose no unreasonable risk of injury to health or the environment, and that EPA is assured of receiving the necessary supporting information. While this approval reflects EPA's findings that the proposed activities satisfy the requirements of 40 CFR 761.61(c) based on the information cited in the Statement of Basis, EPA also recognizes that the unique nature of SST retrieval activities, and the specific inclusion of certain technology demonstration elements in the proposed work make it very possible that new information will be available that warrant explicit EPA evaluation and/or response. This condition ensures EPA's ability to respond appropriately.

- 6) Submissions required by this approval shall be provided to EPA and Ecology as follows:

EPA: Michael A. Bussell
Office of Compliance and Enforcement
EPA Region 10
1200 6th Avenue, OCE-164
Seattle, WA 98101
E-mail: Bussell.michael@epa.gov
Facsimile: (206) 553-7176

W/copies to Dave Bartus
%Washington State Department of Ecology
Facsimile: (509) 372-7971
3100 Port of Benton Blvd.
Richland, WA 99354
E-mail: Bartus.dave@epa.gov
Facsimile: (509) 372-7971
Hanford campus mail stop: HO-57

Ecology: Mike Wilson, Nuclear Waste Program Manager
Washington State Department of Ecology
3100 Port of Benton Blvd.
Richland, WA 99352
E-mail: miwi461@ecy.wa.gov
Hanford campus mail stop: HO-57

The purpose of this condition is to ensure communications required by this approval are directed to the appropriate organizational representatives.

Phase II (Tank-Specific) Conditions

Note: Phase II (tank-specific) conditions for retrieval of tank 241-S-102 is based on the S-102 functions and requirements document, along with supplemental information supporting use of DST supernate as the sluicing media for relatively insoluble S-102 wastes. F&R documents predate the more comprehensive and more detailed tank waste retrieval work plans (TWRWPs) prepared pursuant to Tri-Party Agreement (TPA) Appendix I). As a result, Phase II approval conditions for tank 241-S-102 are more extensive and detailed than EPA expects will be the case for subsequent Phase II approvals based on TWRWP documents.

- 1) For retrieval of tank 241-S-102, the spatial boundaries of this approval shall be the tank 241-SY-102 SY-02A pit for supernate retrieved from tank 241-SY-102, extending to (following the direction of supernate flow/retrieved slurry) the connection to tank 241-SY-102 return riser for slurry returned from tank 241-S-102 to tank 241-SY-102. Tank 241-S-102 is explicitly included within the boundaries of this approval.

This condition defines the scope of this approval. Elements of the 241-SY-102 tank system “upstream” of the SY-02A pit are considered within the scope of the Framework Agreement tank waste disposal system.

- 2) All equipment used for carrying out retrieval activities external to tank 241-S-102 shall comply with the requirements of 40 CFR 265.191 through 196. Tank 241-S-102 proper and any equipment used for retrieval activities internal to this tank are excluded from this requirement. With respect to compliance with the requirements of 40 CFR 265.196 (response to leaks or spills, and disposition of leaking or unfit-for-use tank systems), Energy shall maintain and conduct retrieval operations according to procedures no less stringent than Sections 4.2.2, 5.3 and 6.7.2 of the draft document RPP-17043, Rev. 1d, entitled “Process Control Plan for Saltcake Dissolution in Tank 241-S-102.”

The purpose of this condition is to ensure that PCB remediation waste management activities actually conducted in the field provide substantial assurance that spills, leaks or releases to the environment will not occur, and that should equipment failures or leaks occur, appropriate steps are taken to mitigate such events. For purposes of applying this condition, the cited equipment shall be considered a new tank system. Tank 241-S-102 itself is excluded from this requirement since it is clear that this tank cannot achieve compliance with these standards. The risk of leaks/releases from tank 241-S-102 proper are addressed via Conditions 6 and 7, relating to tank 241-S-102 leak detection monitoring and mitigation, and management of post-retrieval remediation waste residuals, respectively. The requirement to maintain certain procedures is intended to ensure that retrieval operations conducted according to the approved 241-S-102 F&R document are in compliance with this condition. Energy has provided a specific example of equipment which might be used for retrieval in Reference 16. In establishing this condition, EPA finds that compliance with the cited standards provides an adequate basis to demonstrate that retrieval activities will not pose an unreasonable risk of injury to health or the environment with respect to ex-tank retrieval equipment.

- 3) Retrieval activities conducted pursuant to this approval shall be subject to Conditions 2, 3 and 5 of Ecology’s tank 241-S-102 Functions and Requirements primary document approval, dated May 2, 2005. Notification required by Condition 5 of the Ecology approval letter shall be made to EPA contact in Phase I, Condition 5 of this approval as well as to Ecology.

The purpose of this condition is two-fold. First, it is intended to ensure that EPA’s approval of tank 241-S-102 retrieval activities is fully consistent with Ecology’s parallel tank 241-S-102 Functions and Requirements primary document approval. Second, as discussed in the section “Relationship of Energy’s RBDA Application to Department of Ecology Retrieval Approvals” and EPA’s letter of December 9, 2004 (Reference 18) this condition addressed the various factors outside the scope of 40 CFR 761.61(c) upon which Energy’s proposal to use DST supernate for SST retrieval depends.

EPA is not specifically referencing Condition 1 of Ecology’s tank 241-S-102 functions and requirements document approval, since EPA is separately referencing the

supplemental information document addressed by Condition 1 of Ecology's approval. See References 20 and 26.

- 4) Within 45 days following the effective date of this approval, Energy shall submit to EPA a post-retrieval Data Quality Objective (DQO) report and a sampling and analysis plan (SAP) for post-retrieval characterization and residual PCB remediation waste sampling for tank 241-S-102. These plans may be based in whole or part on closure requirements pursuant to Washington Administrative Code 173-303-610). Energy shall ensure that the DQO report and the sampling and analysis plan provide for generation of data characterizing residual PCB remediation waste adequate for purposes of evaluating the risk of injury to human health and the environment from residual PCB remediation waste, and for evaluation of appropriate removal, decontamination or disposal actions for such residual PCB remediation waste. This plan shall be based on and consistent with the requirements of TPA Appendix I Section 2.1 requirements.

The purpose of this condition is to ensure that EPA receives documentation of Energy's plans for post-retrieval residual sampling and analysis, as this information has not been provided as part of Energy's RBDA application or supplemental information. Particulars of how post-retrieval sampling relates to management of PCB remediation waste residuals are discussed in the section "Evaluation of Other Emission Pathways" above. Based on Energy's sampling and analysis plan required by this condition, EPA will modify this RBDA approval to incorporate the approved sampling and analysis requirements and appropriate schedules. EPA expects that the submissions required by this condition will be consistent with, if not identical to, the corresponding documents required by TPA Appendix I Section 2.1.6 – few if any modifications to the TPA-required documents should be necessary to fully comply with this RBDA condition. EPA notes that this TPA requirement provides for submission of a DQO and SAP prior to the start of retrieval activities. It is EPA's informal understanding that tank 241-S-102 retrieval activities will start shortly after finalization of this approval. To provide a reasonable time for Energy to comply with this requirement, EPA is including a 45-day compliance period in lieu of the TPA-required "prior to retrieval" submission schedule.

EPA acknowledges that it has endorsed the TPA Appendix I requirements referenced by Conditions 4, 5 and 6 through approval of TPA change form M-45-04-01. Two key factors, however, warrant restatement of these TPA Appendix I requirements in this risk-based disposal approval. First, EPA's approval of TPA change form M-45-04-01 was based solely on federal statutory authorities cited by the TPA – these do not include the Toxics Substance Control Act. Therefore, this approval is the only EPA action establishing these requirements under TSCA authority.

Second, the language of TPA Appendix I is quite clear that the documents referenced by Conditions 4, 5 and 6 are required to be submitted only to Ecology, not also to EPA. Therefore, Conditions 4, 5 and 6 are necessary to ensure submission of these documents to EPA for consideration under TSCA authority with respect to this Phase II approval.

- 5) Within 120 days following completion of retrieval activities covered by this approval, or other such time corresponding to a submission date approved by Ecology through

applicable TPA administrative processes with respect to requirements of TPA Appendix I Section 2.1.7, Energy shall submit to EPA either a retrieval data report pursuant to the approved DQO/sampling and analysis plan required by Phase II Condition 4 above, or a TPA Appendix H request for exception. This report shall include the information required by TPA Appendix I Section 2.1.7. This report shall specifically include results reasonably available at the time of submission from the High-Resolution Resistivity (HRR) pilot test described in Section 5.4.5 of the tank 241-S-102 Functions and Requirements TPA primary document as approved by Ecology.

The purpose of this condition is to ensure that EPA receives data necessary to evaluate the environmental performance of retrieval activities necessary to evaluate the need for and nature of post-retrieval PCB remediation waste residual management requirements. This condition and its schedule is fully consistent with requirements in the TPA for submissions to Ecology, documented in TPA Appendix I, Section 2.1.7. EPA notes that only portions of the approved HRR test plan (RPP-17191, Rev. 1) will be completed during tank 241-S-102 retrieval, and that key portions will be conducted following completion of retrieval activities. EPA is requiring inclusion in the post-retrieval report only those results that are reasonably available for reporting at the time the post-retrieval report or Appendix H exception report are to be submitted. EPA is requiring submission of the final HRR test plan report under a separate condition of this approval.

EPA is including language in Conditions 5 and 6 to accommodate possible modification of TPA Appendix I schedules approved by Ecology. Consistent with EPA's stated intent that retrieval requirements and schedules be developed through the RCRA process under Ecology lead regulatory agency oversight, EPA believes it entirely appropriate for TSCA to conform to Ecology-authorized project schedules. In the highly-unlikely event that EPA finds that Ecology-authorized schedules do not support a finding of no unreasonable risk, EPA may modify Conditions 5 and 6 accordingly pursuant to Phase I approval condition 5. It is EPA's intent to structure conditions relating to existing TPA requirements in a way that avoids duplicative administrative processes that may be necessary to ensure consistency between TPA/RCRA requirements and conditions of this approval.

- 6) Within 120 days following completion of retrieval activities covered by this approval, or other such time corresponding to a submission date approved by Ecology through applicable TPA administrative processes with respect to requirements of TPA Appendix I Section 2.2.1, Energy shall submit plans and schedules for removal, decontamination or disposal of post-retrieval residual PCB remediation waste. These plans and schedules may be based upon and consistent with component closure activity plans for tank 241-S-102 required by WAC 173-303-610, and TPA Appendix I Section 2.2.1. If component closure activity plans are used in whole or part as the basis for post-retrieval management of residual PCB remediation waste, Energy shall ensure that total PCBs, measured as the sum of Aroclors, are identified as constituents of concern in the component closure activity plans. For retrieval equipment within the scope of Phase II, Condition 1 that may be used for subsequent SST retrievals requiring approval under 40 CFR 761.61(c), Energy may submit documentation of the proposed reuse in lieu of the otherwise-required plans and schedules. These plans and schedules shall comprehensively address all

aspects of residual PCB remediation waste management related to activities covered by this authorization, specifically including but not limited to in-tank residuals in tank 241-S-102, any spills, releases or leaks from tank 241-S-102 during retrieval, residuals in equipment within the scope of Phase II, Condition 1 and any related spills or releases. Energy may also request from EPA written approval of alternate submission schedules as necessary to ensure integration of these submissions with permit modification requests and component closure activity plans required by the Washington State Department of Ecology pursuant to TPA milestone M-45-15.

The purpose of this condition is to ensure that EPA timely receives Energy's plans relevant to post-retrieval management of PCB remediation waste residuals. As discussed in this approval and in EPA's letter of December 9, 2004 (Reference 18), EPA anticipates that closure activities and requirements developed pursuant to WAC 173-303-610, -640, and -800 will provide a basis to demonstrate that the proposed retrieval activities do not pose an unreasonable risk of injury to human health or the environment with respect to remediation waste residuals. That said, EPA is wording this condition to state that such plans "may" be based upon, rather than "shall" be based upon to accommodate the possibility that post-retrieval flushing of tank 241-S-102 may be sufficiently effective that post-retrieval management of PCB remediation waste residuals is better addressed through a decontamination-based strategy than one based on a RCRA-based component closure activity plan.

This RBDA condition is consistent with the requirements of TPA Appendix I, Section 2.2.1, which requires submission of a RCRA closure plan/permit modification request no later than concurrent with the retrieval data report or Appendix H exception request required by TPA Appendix I Section 2.1.7, which in turn is 120 days following completion of retrieval activities. Therefore, this condition is functionally identical to corresponding TPA requirements governing submission of closure component activity work plans to Ecology.

The RBDA condition relating to inclusion of PCBs in component closure activity plans is to help ensure that decision documents developed pursuant to regulatory authorities other than TSCA (specifically, Ecology's authorized dangerous waste program) will satisfy TSCA requirements when reviewed by EPA for incorporation into this approval. Nothing in this condition is intended to preclude self-implementing re-use, decontamination or disposal of retrieval equipment external to tank 241-S-102 in compliance with applicable rules and requirements prior to submission of documents required by this condition.

- 7) Energy shall maintain and operate a baseline (drywell monitoring) and supplemental (modified static liquid level monitoring/waste material balance) leak detection, monitoring and mitigation (LDMM) system. With respect to this system, Energy shall maintain and conduct retrieval operations pursuant to procedures consistent with Sections 5.1, 5.2, and 6.7.1 of RPP-17043, Rev. 1e, entitled "Process Control Plan for Saltcake Dissolution in Tank 241-S-102".

EPA is establishing this condition to ensure, to the extent technically practicable, that potential leaks from tank 241-S-102 are detected during or following retrieval activities.

Although Energy's RBDA application provides no basis to conclude that tank 241-S-102 is currently leaking or is likely to leak during retrieval, the design and age of SSTs in general make it clear that an engineering approach alone to preventing leaks is not defensible. Therefore, EPA considers an explicit condition requiring an LDMM system necessary to demonstrate that the approved retrieval activities do not pose an unreasonable risk of injury. EPA is providing specific references to the process control plan document as a performance baseline for procedures necessary to implement the required LDMM system as the basis for this approval. EPA understands that portions of this document will not be finalized until shortly before retrieval activities subject to this authorization begin, and that the document may be periodically revised during retrieval. To accommodate these expected revisions without delays to retrieval activities, EPA is requiring Energy to maintain procedures on a performance, not proscriptive basis, regardless of the format or organization of the document during retrieval activities.

EPA notes that the combination of drywell monitoring and liquid level monitoring represent the best currently available technology for SST leak detection. EPA will be reviewing results of the high-resolution resistivity (HRR) LDMM technology being deployed on a demonstration basis at tank 241-S-102. Should HRR offer improved leak detection performance (minimum detectable leak, time required for detection, etc.), EPA will consider application of HRR to future SST retrievals requiring TSCA authorization for use of DST supernate. See Condition 9.

- 8) Energy may request changes to schedules specified in these tank 241-S-102 Phase II conditions. Such requests shall be in writing, including justification for the requested modifications, and submitted to the EPA contacts listed in Phase I, Condition 6. Prior to written approval of the requested change, Energy shall comply with the existing conditions of this approval.

The purpose of this condition is to reflect EPA's recognition that some elements of retrieval activities (including reporting and documentation) covered by this approval may of necessity require additional time beyond that specified in this approval. In addition, EPA recognizes the need for work to be conducted pursuant to this approval to be integrated to the extent practicable and consistent with EPA's obligation to ensure the approved activities do not pose an unreasonable risk of injury to health or the environment with requirements by Ecology.

- 9) Energy shall submit to EPA the final report of high-resolution resistivity (HRR) leak detection test conducted pursuant to the Ecology-approved test plan RPP-17191, Rev. 1, concurrent with submission of this report to Ecology.

The purpose of this condition is to ensure that data necessary for evaluation of HRR performance as a LDMM technology and whether HRR should be applied to future retrievals within the scope of Energy's RBDA application. EPA notes that no report submission date has been established by Ecology – for purposes of program integration, EPA will defer to Ecology's role as lead regulatory agency overseeing retrieval activities under RCRA authorities to establish appropriate schedules with respect to future retrieval activities.